GENERATING UNITS

The generators produce electricity at 13,800 volts which is stepped up to 115,000 volts and 230,000 volts for transmission. Generator units 1, 2, and 3 are rated at 121.6 megawatts each. Generator units 4 and 5 are rated at 109.25 megawatts each. For an average year the 5 generating units have a combined annual output of 2,600,000 megawatt hours of electricity. The generator rotors on units 1, 2, and 3 are 35 feet in diameter and weigh 517 ½ tons. The rotors on units 4 and 5 are 33.5 feet in diameter and weigh 321 tons. All of the rotors are about 7 feet high. During generator operation, the outside edge of the rotor travels at a speed of about 113 m.p.h.

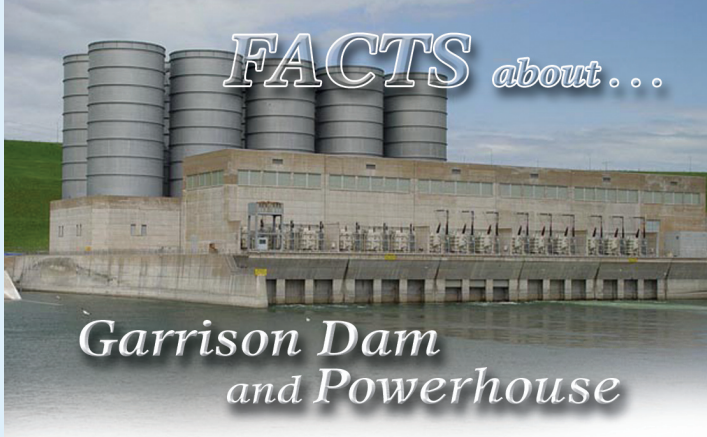
GENERATOR ROTOR

THE SPILLYWAY STRUCTURE

The purpose of the Spillway is to control the water level during an emergency situation. To date, the Spillway has never been used to release flood waters. The Spillway has 28 gates. Each gate is 29 feet high by 40 feet wide. The total length of the Spillway is almost 3200 feet and was designed for a maximum discharge capacity of 827,000 cubic feet per second at an elevation of 1858.5 mean sea level (MSL). Water released through the gates can reach a speed of 75 miles per hour en route to the stilling basin. The spillway chute contains 42 acres of concrete 18 inches thick. The stilling basin at the end of the chute contains 20 acres of concrete up to a thickness of 5 feet.

GARRISON POWER PLANT

Garrison Project/Lake Sakakawea
P. O. Box 527
Riverdale, ND 58565
Call: 701-654-7441

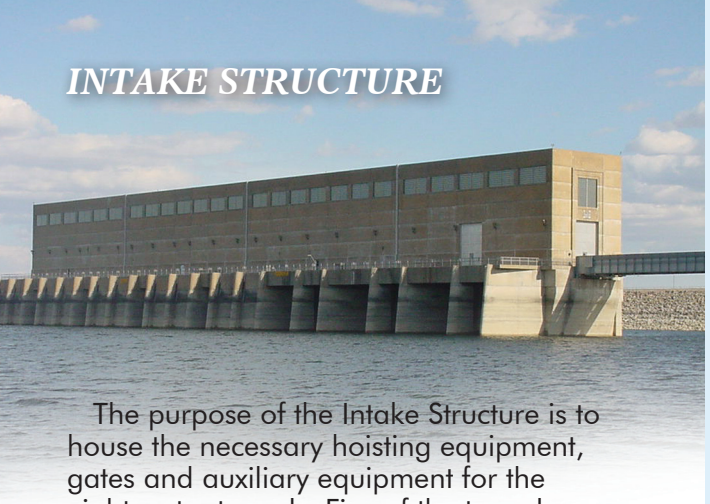


FACTS about . . .

Garrison Dam and Powerhouse

Construction on the Garrison Project began in 1947 and was completed seven years later in 1954 at a cost of approximately 300 million dollars. Garrison Dam is the fifth largest earthen dam structure in the United States with a volume content of 66,500,000 cubic yards of fill material. It would take a train 16,000 miles long to carry the entire fill in the dam. This is equivalent to one train spread from coast to coast 5 times. The largest earthen dam structure in the United States is Fort Peck with 125,626,000 cubic yards of fill. Oahe Dam is second with 91,996,000 cubic yards of fill. Lake Sakakawea, the reservoir created by Garrison Dam, is the third largest reservoir in the U.S. At its maximum pool elevation 1854' mean sea level (MSL), the reservoir holds about 24 million acre-feet of water. The lake is 178 miles long, has over 1530 miles of shoreline, and covers 382,000 surface acres. Lake Mead, created by Hoover Dam, is the largest reservoir in the U.S. at 28,300,000 acre-feet of water. The reservoir created by Glen Canyon Dam is the second largest in the U.S. at 26,997,000 acre-feet. The reservoir created by Garrison dam contains approximately 32% of the total water stored by the six Missouri River Mainstem reservoirs. Garrison is a multi-purpose project providing for hydroelectric power production, irrigation, flood damage reduction, navigation, fish and wildlife, municipal and industrial water supply, water quality and recreation.

INTAKE STRUCTURE



The purpose of the Intake Structure is to house the necessary hoisting equipment, gates and auxiliary equipment for the eight water tunnels. Five of the tunnels are for power generation and three are for regulating water releases.

- Height 249 Feet
- Length 540 Feet
- Width 170 Feet

The picture above shows the Project Intake Structure. The structure is 7 feet, 8 inches higher than the 18 story N.D. State Capitol building; its base slab is 540 feet long compared to the Capitol's 402 foot length. This structure regulates and directs water flow into the eight water tunnels. The water in the reservoir covers most of the structure, rising nearly to the top of the service bridge piers.

PENSTOCKS

The purpose of the penstocks is to carry water from the Intake Structure to the scroll case around the turbine. Water moves through the penstocks at a rate of 60,000 gallons per second and at a speed of 12 to 13 m.p.h.

Number of Penstocks 5
- Diameter 24 Feet
- Length 1650 Feet

SURGE TANKS

The purpose of the surge tanks is to absorb the shock from the sudden stopping of water flow by the wicket gates. The surge tanks are made of welded steel plate.

Number of Surge Tanks 10
(2 for ea. Penstock)
- Height 135.7 Feet
- Diameter 65 Feet
- Capacity 3,350,000 gallons each

POWERHOUSE BUILDING

- Height 163 Feet
- Length 522 Feet
- Width 134 Feet

TURBINE

The turbine rotates at 90 revolutions per minute and operates at a maximum 149,500 horsepower. The turbine is 7 feet high and has a diameter of 18 feet.

SHAFT

The shaft which connects the turbine to the rotor weighs 100 tons in units 1, 2, and 3 and 68 tons in units 4 and 5. The upper part of the shaft is 25'1" long in units 1, 2, and 3, and 19' long in units 4 and 5. The lower part of the shaft is 17' long in all the units. The shaft is 3'8" in diameter in all units.